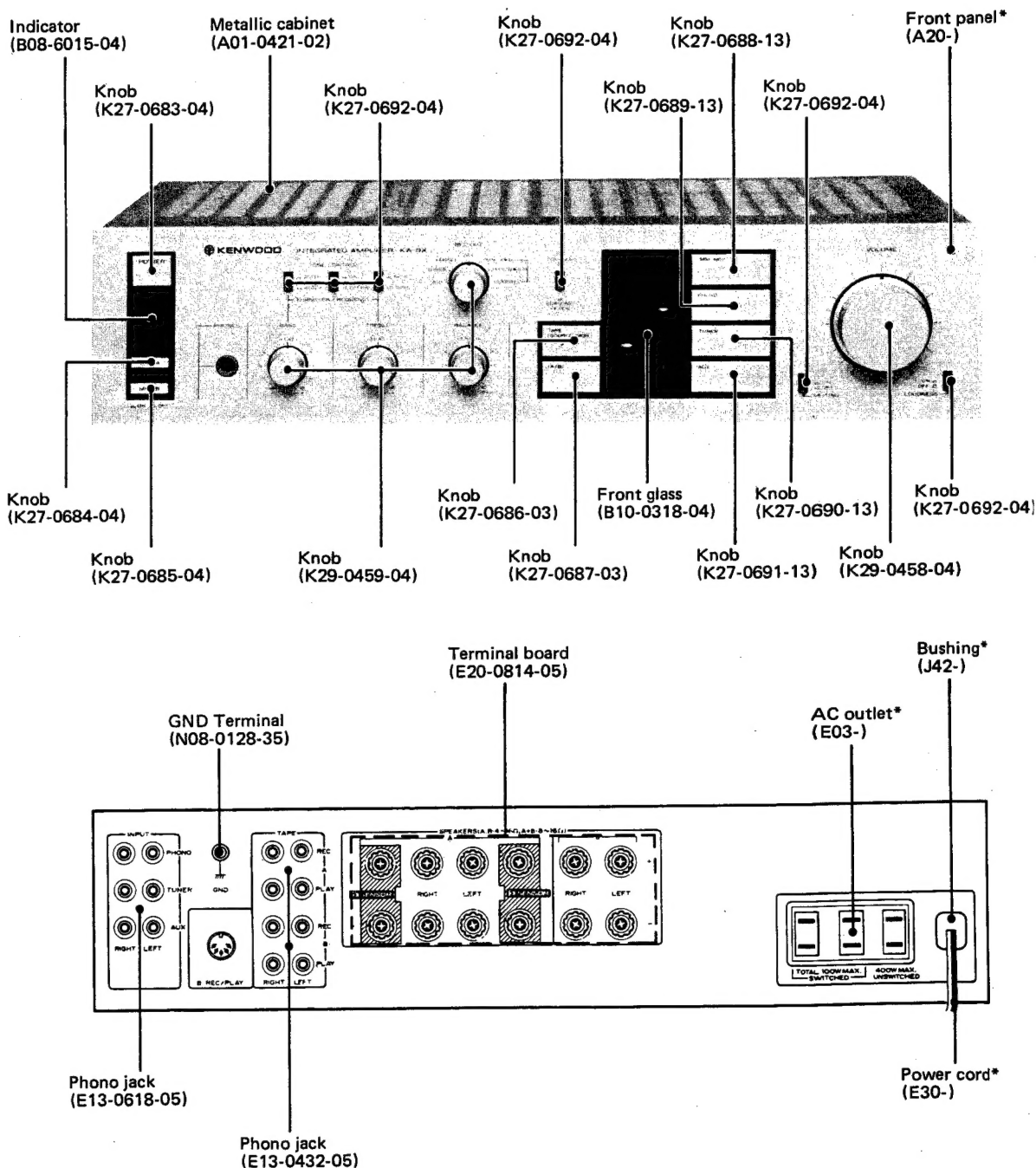




KENWOOD®

KA-9X/9XC

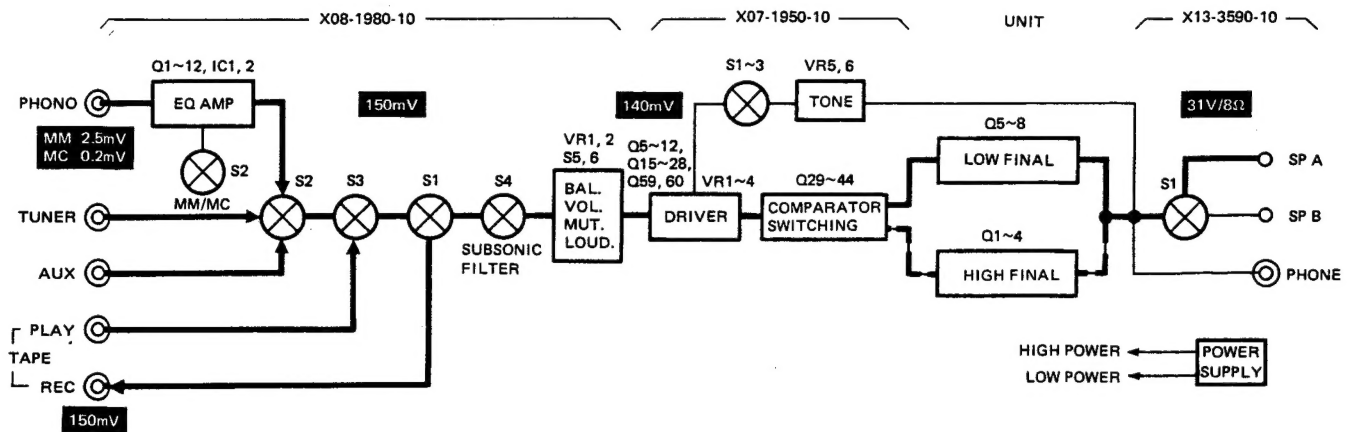
INTEGRATED AMPLIFIER



* Refer to Parts List on page 11.

BLOCK & LEVEL DIAGRAM/CIRCUIT DESCRIPTION

BLOCK & LEVEL DIAGRAM



CIRCUIT DESCRIPTION

The main amplifier employed in KA-9X (7X) consists of a 3-stage differential class A voltage amplifier and a 3-stage Darlington class B SEPP. Unlike the conventional circuit configuration, the final stage has a couple of circuits: one for low voltages and one for high voltages. During normal operation, transistors (Q5~Q8) on the low-voltage side perform their function, reducing the heat generation and power consumption of the amplifier (Refer to "Heat Generation and Power consumption of Amplifier" on the next page). During high power output operation, transistors (Q1~Q4) on the high-voltage side become active, ensuring optimum operation of the amplifier with minimum heat generation. For optimizing the amplifier operation, a comparator circuit, holding circuit, and distributor circuit, consisting of Q29~Q44, are also provided.

The following explains the amplifier operation at the positive side of channel L (see Figure 1).

The input signal from the emitter Q25 enters the distributor circuit Q29/Q33. Normally, Q33 is turned on by R77 and transfers the input signal to Q5 on the low-voltage side. If the input signal level is higher than the reference voltage V_x (approximately 30V) of the comparator Q41, Q41 is turned on through the emitter of Q5 and D15. At the same time, Q37 of the holding circuit turns on, causing Q29 of the distributor circuit to turn on. When Q29 turns on, the Q33 base-emitter bias becomes zero, turning off Q33. Then, the input signal is transmitted to Q1 on the high-voltage side, allowing high power output operation. D11 and R73 are provided to impart hysteresis characteristic ($V_x \rightarrow V_x'$, approximately 23V) to the comparator circuit and ensure distribution operation. D15 is provided for the comparator Q41, which normally has an inverse bias. The holding circuit (Q37, C27, R91 and R95) keeps Q29 on for a certain period of time (t), enabling operation of the high-voltage side. This circuit inhibits the distributor circuit operation if the input signal level and frequency are substantially high, and thereby prevents the distortion factor from deteriorating.

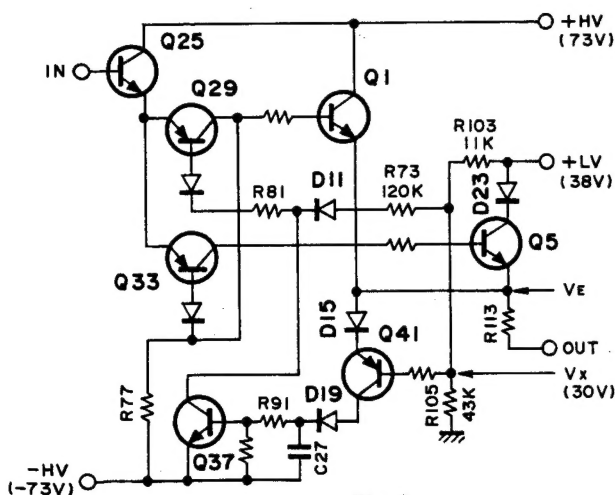


Fig. 1

CIRCUIT DESCRIPTION

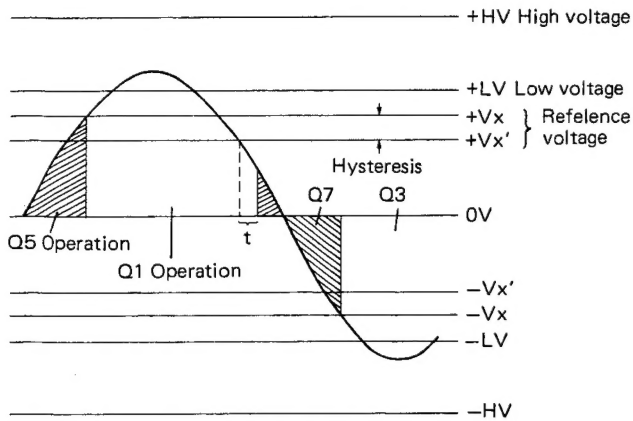


Fig. 2 50Hz, 60W Output waveform

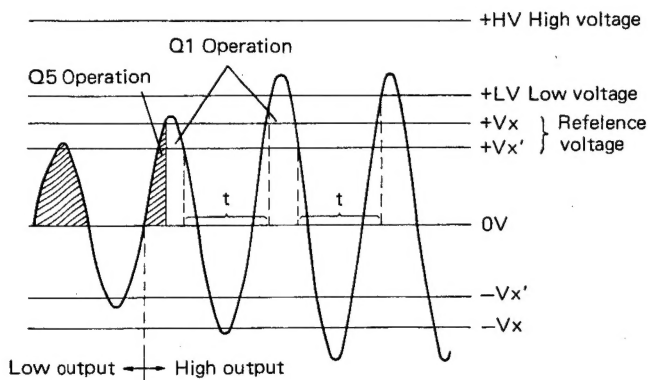


Fig. 3 1kHz Output waveform

Heat Generation and Power Consumption of Amplifier

The main amplifier which drives the speaker provides the speaker with electric energy, which is converted into acoustic energy by the speaker. This conversion of energy requires the operation called power amplification. Since in reality perfect power amplification is impossible (the theoretical efficiency for class B amplifier is 78.5%), substantial amounts of heat are generated in process.

Typical heat generating parts are:

- (1) Final transistor
- (2) Power transformer
- (3) Power circuit (rectifying diodes, etc.)
- (4) Lamps, etc.

The following explanation is concerned with item (1), above. Consider a class B SEPP circuit as shown in Figure 4. The power consumption P_c of each of the transistors can be expressed as the product of the collector current I_c and the collector-emitter voltage V_{CE} . Thus,

$$P_c = I_c \times V_{CE} \dots\dots\dots(1)$$

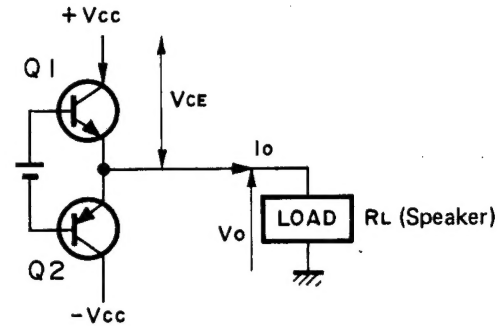


Fig. 4 SEPP Circuit

The instantaneous value of P_c expressed in equation (1) represents the transistor power consumption at given instant, which is lost in the form of heat. That is, P_c is a wasted power not supplied to the load.

On the other hand, the power P supplied to the load is calculated by the following equation:

$$P_o = I_o \times V_o \dots\dots\dots(2)$$

Assuming the amplifier output voltage V_o as having a sine wave ($V_o = V_o \sin \omega t$) and ignoring idle current, the wave forms of the output voltage V_o and output current I_o appear as shown in Figure 5. (For simplicity, the load is assumed as a pure resistor.)

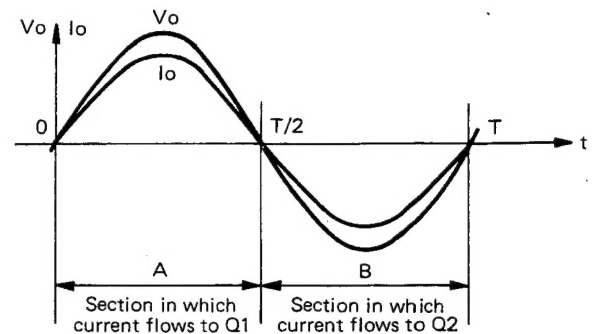


Fig. 5 SEPP Circuit output current/voltage

The power consumption of Q1 alone is calculated as follows:

$$P_c = I_c \times (V_{cc} - V_o)$$

CIRCUIT DESCRIPTION

Since $I_o = I_c$ in section A and $I_c = 0$ in section B (see Figure 5), the actual power consumption irradiated as heat is the time average of P_c ($\overline{P_c}$), which is calculated as follows :

$$\begin{aligned}\overline{P_c} &= \frac{1}{T} \int_0^T P_c dt \\ &= \frac{1}{T} \int_0^{\frac{T}{2}} I_o (V_{cc} - V_o) dt + \int_{\frac{T}{2}}^T 0 dt \\ &= \frac{1}{T} \int_0^{\frac{T}{2}} \frac{V_o}{R_L} \sin \omega t (V_{cc} - V_o \sin \omega t) dt \\ &= \frac{1}{T} \int_0^{\frac{T}{2}} \frac{V_{cc} V_o}{R_L} \sin \omega t dt - \frac{1}{T} \int_0^{\frac{T}{2}} \frac{V_o^2}{R_L} \sin^2 \omega t dt \\ &= \frac{1}{2R_L} \left(\frac{2}{\pi} V_{cc} V_o - \frac{V_o^2}{2} \right)\end{aligned}$$

To obtain the maximum value of $\overline{P_c}$, $\overline{P_c}$ is differentiated by V_o as follows :

$$\frac{d\overline{P_c}}{dt} = \frac{1}{2R_L} \left(\frac{2}{\pi} V_{cc} - V_o \right)$$

Thus, $\overline{P_c}$ becomes maximum when $V_o = 2/\pi V_{cc}$.

$$\overline{P_{c \max}} = \frac{1}{\pi^2} \frac{V_{cc}^2}{R_L}$$

The greater the power supply voltage V_{cc} , the greater becomes the $\overline{P_{c \max}}$. Similarly, since the time average of P_o ($\overline{P_o}$) is supplied to the load, $\overline{P_o}$ is calculated as follows :

$$\begin{aligned}\overline{P_o} &= \frac{1}{T} \int_0^T I_o \times V_o dt \\ &= \frac{1}{T} \int_0^{\frac{T}{2}} \frac{V_o^2}{R_L} \sin^2 \omega t dt\end{aligned}$$

$$\overline{P_o} = \frac{V_o^2}{2R_L}$$

Needless to say, the power supplied to the load becomes maximum when $V_o = V_{cc}$. Hence,

$$\overline{P_{o \max}} = \frac{V_{cc}^2}{2R_L}$$

Namely,

$$\frac{\overline{P_{c \max}}}{\overline{P_{o \max}}} = \frac{2}{\pi^2} \doteq 0.203 \dots \dots$$

Assuming $\overline{P_o}$ at $V_o = 2V_{cc}/\pi$ as $\overline{P_{o1}}$

$$\overline{P_{o1}} = \frac{4}{\pi^2} \cdot \frac{V_{cc}^2}{2R_L} \doteq 0.405 \overline{P_{o \max}}$$

Thus, P_c of a single output transistor of class B SEPP becomes maximum when the output is approximately 40% of the full power, the maximum value being approximately 20% of the full power.

Note that it is normally necessary to pass an idle current (approximately 20 to 100mA). This current also increases in proportion to the voltage. Note also that if the load is not a pure resistor, but has a reactance component (e.g., speaker load), a reactive power component occurs. This reactive power should be consumed by the amplifier, hence the amount of heat generated inside the amplifier (output transistor) further increases.

Since P_c is proportional to the full power, amplifiers whose full power is smaller (i.e., amplifiers with lower power supply voltage) produce smaller amounts of heat. This means that the amount of heat generated by the final transistor and the radiator size can be reduced by using an amplifier of low power supply voltage during normal operation and by operating another amplifier of high power supply voltage only when a high output is required.

Also, by using the same winding for the power transformer to pick up both high and low voltages, it is possible to reduce the transformer internal loss and the transformer size, since the current does not constantly flow through the high-voltage side. The power transformer and radiator occupy the greater part of the amplifier weight, space, and cost. The reduction in size of these components means, therefore that an amplifier of greater power output can be offered to users at a lower cost.

ADJUSTMENT/REGLAGE/ABGLEICH

ADJUSTMENT

| NO. | ITEM | INPUT SETTINGS | OUTPUT SETTINGS | AMPLIFIER SETTINGS | ALIGNMENT POINTS | ALIGN FOR | FIG. |
|-----|--------------|----------------|--------------------------------------------------|--------------------------|--------------------|-----------|------|
| 1 | OFFSET | — | Connect a DC voltmeter to SPEAKER A terminals. | SPKR : A VOLUME : 0 | VR1 (L) VR2 (R) | 0V | |
| 2 | IDLE CURRENT | — | Connect a DC voltmeter across R113 (L), R114 (R) | SPKR : OFF VOLUME : 0 | VR3 (L) VR4 (R) | 8mV | |

REGLAGE

| Nº | ITEM | REGLAGE DE L'ENTREE | REGLAGE DE LA SORTIE | REGLAGE DE L'AMPLIFICATEUR | POINTS L'ALIGNMENT | ALIGNER POUR | FIG. |
|----|------------------------------------|---------------------|---------------------------------------------------------------------|----------------------------|--------------------|--------------|------|
| 1 | OFFSET | — | Brancher le voltmètre de CC aux bornes de sortie + et —. (SPKR : A) | SPKR : A VOLUME : 0 | VR1 (L) VR2 (R) | 0V | |
| 2 | REGLAGE DU COURANT DE POLARISATION | — | Conneter un voltmètre CC sur R113 (L), R114 (R). | SPKR : OFF VOLUME : 0 | VR3 (L) VR4 (R) | 8mV | |

ABGLEICH

| NR. | GEGENSTAND | EINGANGS-EINSTELLUNG | AUSGANGS-EINSTELLUNG | VORSTÄRKER EINSTELLUNG | ABGLEICH-PUNKTE | ABGEICHEN FÜR | ABB. |
|-----|------------|----------------------|------------------------------------------------------------------|--------------------------|--------------------|---------------|------|
| 1 | OFFSET | — | Einen Gleichspannungsmesser über SPKR : A anschließen. | SPKR : A VOLUME : 0 | VR1 (L) VR2 (R) | 0V | |
| 2 | LEERLAUFS | — | Einen Gleichspannungsmesser über R113 (L), R114 (R) anschließen. | SPKR : OFF VOLUME : 0 | VR3 (L) VR4 (R) | 8mV | |

Note :

A self-restoring thermal switch is built into the power transformer. This switch is activated to cut output of the transformer when its temperature rises beyond 150° C. The amount of time required for recovery is approximately 5 minutes.

Remarque :

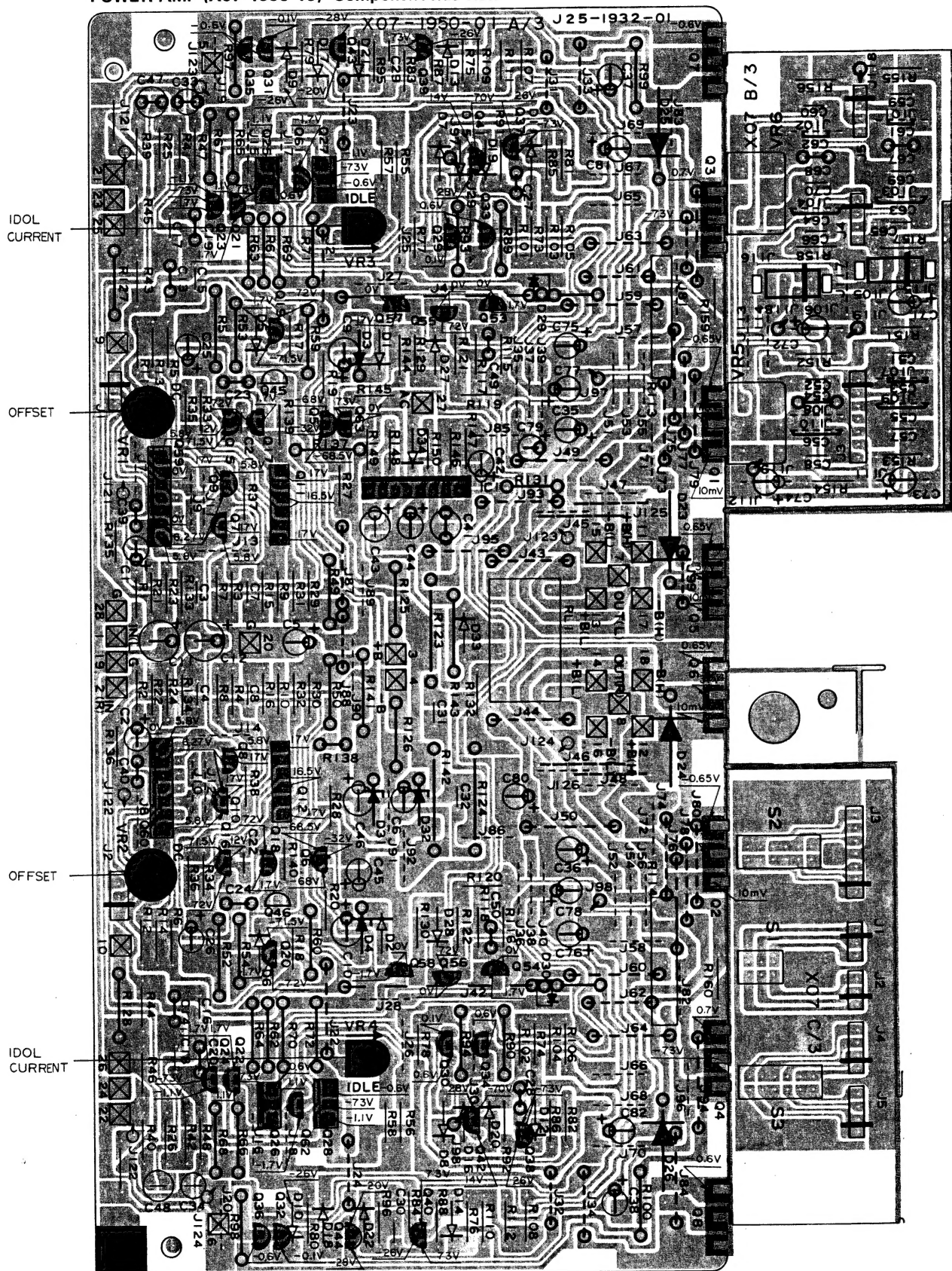
Un commutateur thermique à auto-déclenchement est incorporé au transformateur de puissance. Ce commutateur est activé pour couper l'alimentation du transformateur lorsque sa température s'élève au dessus de 150° C. Cinq minutes sont environ nécessaires pour que le transformateur soit de nouveau mis sous tension.

Bemerkung :

Ein Rückstell-Thermoschalter ist in den Netztransformator eingebaut. Der Schalter wird aktiviert, wenn seine Temperatur über 150° ansteigt, wobei der Transformatorausgang abgetrennt wird. Die zur Erholung erforderliche Zeit beträgt ca. 5 Minuten.

PC BOARD

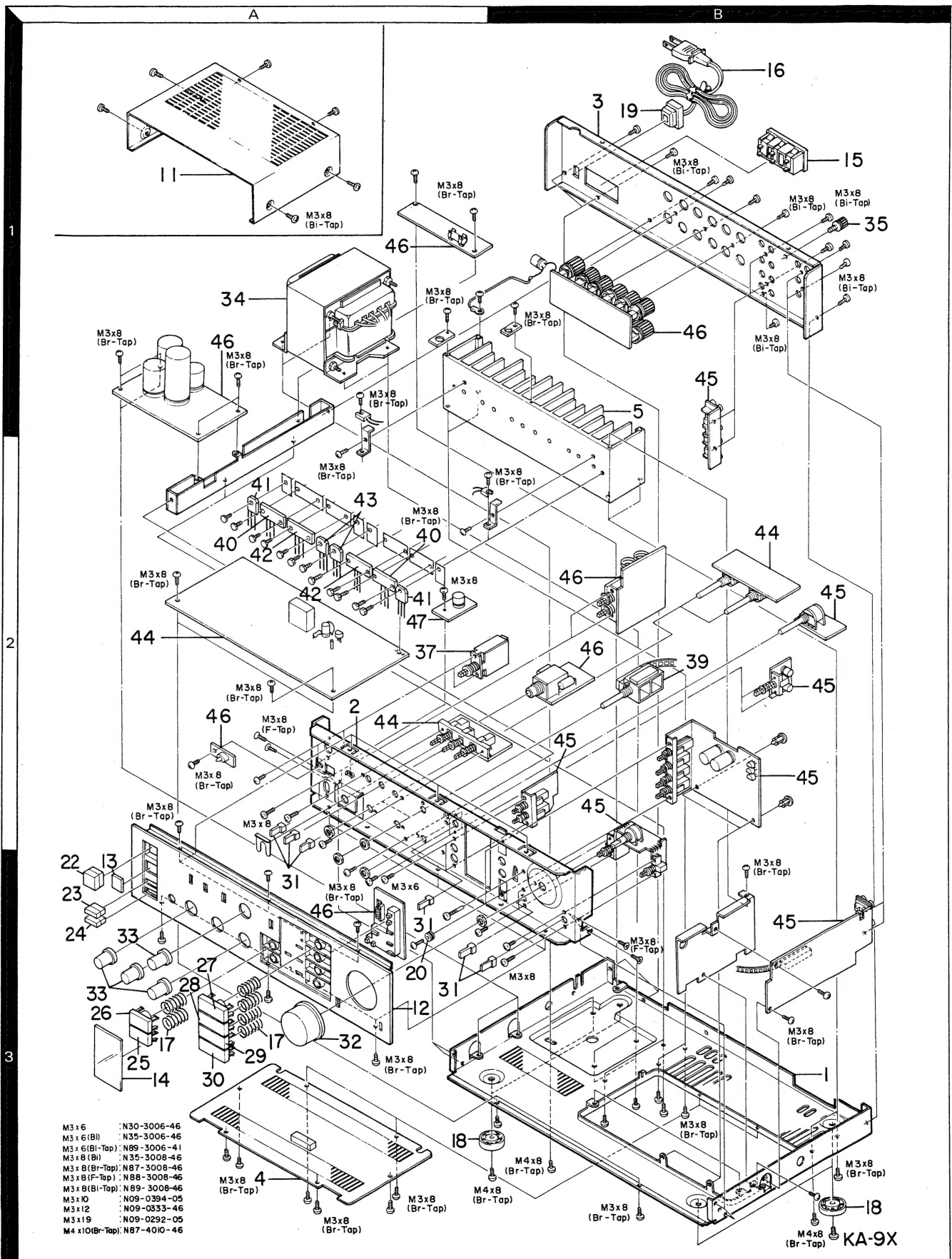
POWER AMP (X07-1950-10) Component side view

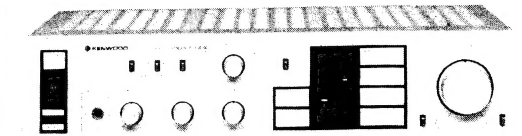
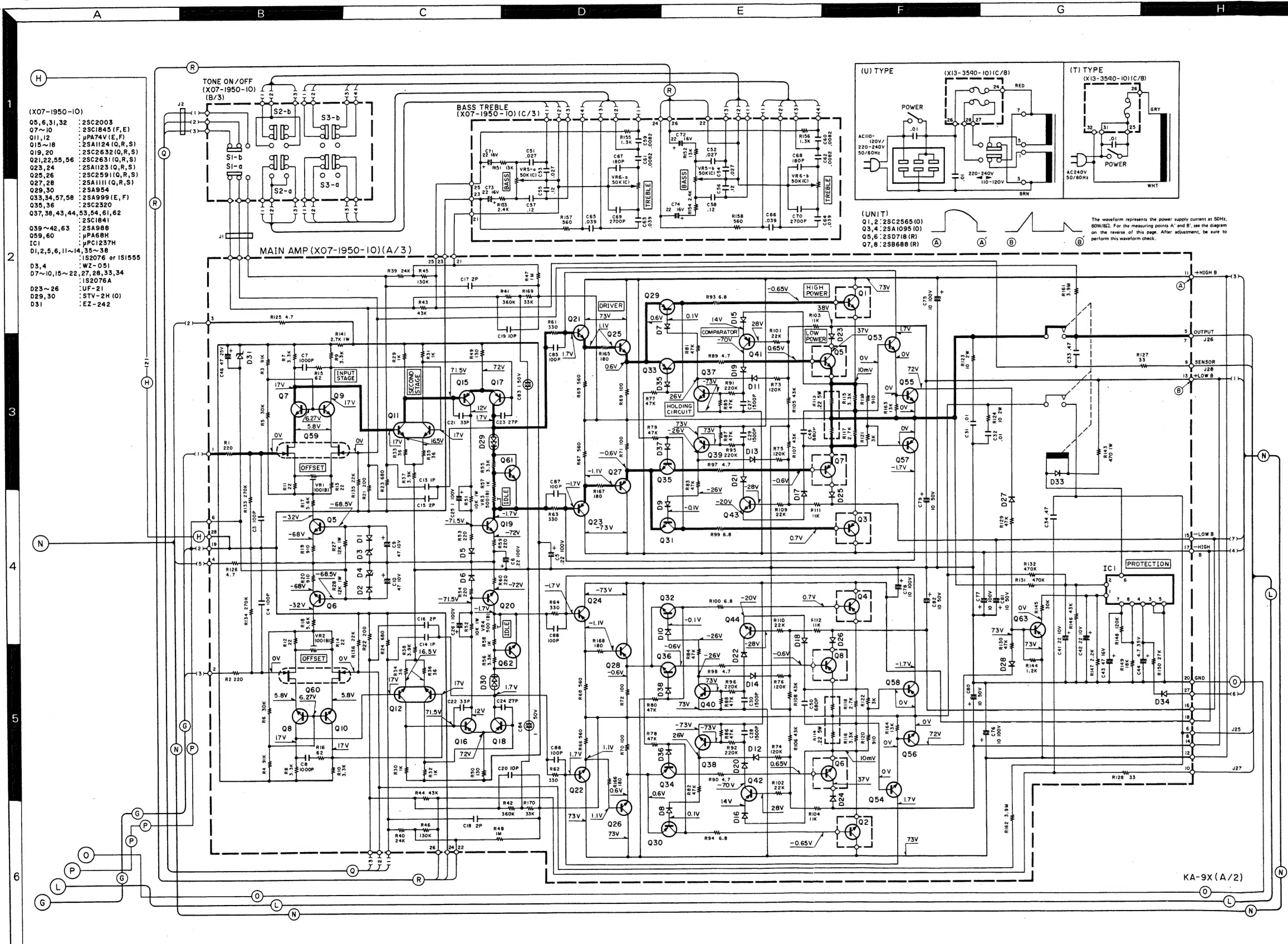


Refer to the schematic diagram for the values of resistors and capacitors.

The PC board drawing is viewed from the side easy to check.

EXPLODED VIEW





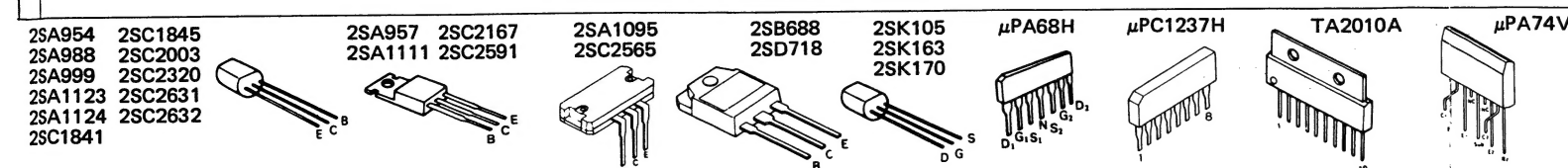
SPECIFICATIONS

| | |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Power output | 120 watts per channel minimum RMS, both channels driven, at 8 ohms from 20 Hz to 20,000 Hz with no more than 0.008% total harmonic distortion. |
| Both Channel Driven into 8 ohms at 1 kHz | 130 watts |
| Both Channel Driven into 4 ohms at 1 kHz | 170 watts |
| Dynamic Power Output into 4 ohms | 600 watts |
| Total Harmonic Distortion | (20 Hz to 20,000 Hz) |
| AUX input to SPEAKER output | 0.008% at rated power into 8 ohms |
| AUX input to 8 ohms | 0.008% at 1/2 rated power into 8 ohms |
| Intermodulation Distortion | (60 Hz: 7 kHz = 4:1) |
| Damping Factor | 1,000 at 100 Hz |
| Transient Response | |
| Rise Time | 1.7 μs |
| Slew Rate | ≥ 100 V/μs |
| Frequency Response | DC to 200 kHz, -3 dB |
| Speaker Impedance | Accept 4 ohms to 16 ohms |
| Input Sensitivity/Impedance | |
| Phono (MM) | 2.5 mV/47 kohms |
| Phono (MC) | 0.2 mV/100 kohms |
| Tuner, AUX, Tape A, B | 150 mV/47 kohms |
| Signal-to-Noise Ratio (IHF, A) | |
| Phono (MM) | 87 dB for 2.5 mV input |
| | 93 dB for 5.0 mV input |
| | 99 dB for 10 mV input |
| Phono (MC) | 76 dB for 0.25 mV input |
| | 76 dB for 0.5 mV input |
| Tuner, AUX, Tape A, B | 107 dB for 150 mV input |
| Maximum Input Level | |
| Phono (MM) | 250 mV (RMS), T.H.D. 0.008% at 1,000 Hz |
| Phono (MC) | 20 mV (RMS), T.H.D. 0.008% at 1,000 Hz |
| Output Level/Impedance | |
| Tape REC (Pin) | 150 mV/330 kohms |
| (DIN) | 30 mV/60 kohms |
| Phono Frequency Response | RIAA standard curve ± 0.3 dB (20 Hz to 20,000 Hz) |
| Tone Control | |
| Bass Turnover Freq, 200 Hz | ± 10 dB at 50 Hz |
| | 400 Hz |
| Treble Turnover Freq, 3 kHz | ± 10 dB at 100 Hz |
| | ± 10 dB at 10 kHz |
| | ± 10 dB at 20 kHz |
| Loudness Control | ± 10 dB at 100 Hz (at -30 dB VOLUME Level) |
| Subsonic Filter | 18 Hz, 6 dB/oct |
| GENERAL | |
| Power Requirements | 80 Hz 120 V (U.S.A. & Canada Model) |
| | Model sold elsewhere incorporates switches to accommodate 50/60 Hz 110-120 V/220-240 V |
| Power Consumption | 700 W (Rated power at 8 ohms) |
| A.C. Outlets | Switched 2, Unswitched 1 |
| Dimensions | |
| | W 440 mm (17-5/16") |
| | H 108 mm (4-1/8") |
| | D 340 mm (13-3/8") |
| Net Weight | 10.2 kg (22.4 lb) |

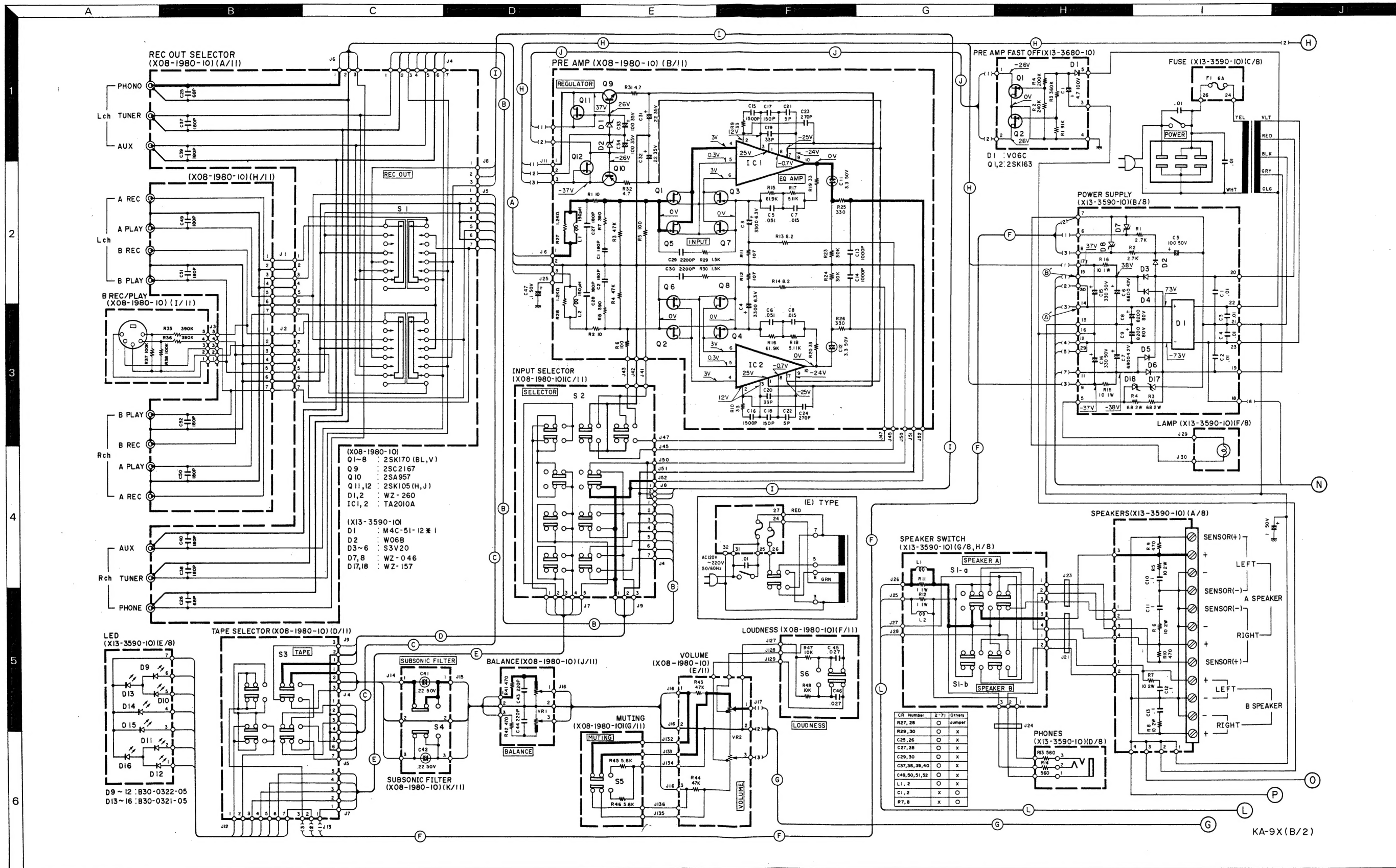
Kenwood follows a policy of continuous advancements in development. For this reason specifications may be changed without notice.

Kenwood poursuit une politique de progrès constants en ce qui concerne le développement. Pour cette raison, les spécifications sont sujettes à modifications sans préavis.

Kenwood strebt ständige Verbesserungen in der Entwicklung an. Daher bleiben Änderungen der technischen Daten jederzeit vorbehalten.

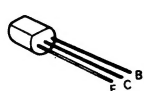


- DC voltages are measured by a VOM of 20kΩ/V input impedance.
- Les tensions de courant continu sont mesurées par un multimètre d'une impédance d'entrée de 20kΩ/V.
- Die Gleichstrom-Spannungen werden durch ein Vielfachmeßgerät von 20kΩ/V Eingangs-Impedanz gemessen.

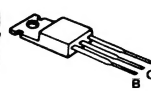


KA-9X (B/2)

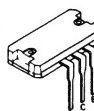
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2SA988 2SC2003
2SA999 2SC2320
2SA1123 2SC2631
2SA1124 2SC2632
2SC1841



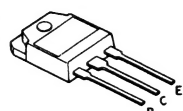
2SA957 2SA1111
2SC2167 2SC2591



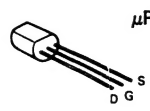
2SA1095 2SC2565



2SB688 2SD718



2SK105 2SK163 2SK170



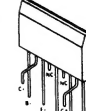
μPA68H



μPC1237H



TA2010A



μPA74V

- DC voltages are measured by a VOM of 20kΩ/V input impedance.
- Les tensions de courant continu sont mesurées par un multimètre d'une impédance d'entrée de 20kΩ/V.
- Die Gleichstrom-Spannungen werden durch ein Vielfachmeßgerät von 20kΩ/V Eingangs-Impedanz gemessen.

PARTS LIST

★ New Parts

Parts without **Parts No.** are not supplied.Les articles non mentionnés dans le **Parts No.** ne sont pas fournis.Teile ohne **Parts No.** werden nicht geliefert.

| Ref. No. 参照番号 | Parts No. 部品番号 | Description 部品名 / 規格 | Re- marks 備考 |
|------------------|-------------------|-------------------------|--------------------|
| KA-9X (UNIT) | | | |
| 1 3B | NO STOCK | MAIN CHASSIS | |
| 2 2A | NO STOCK | SUB PANEL | |
| 3 1B | NO STOCK | REAR PANEL | |
| 4 3A | NO STOCK | BOTTOM PLATE | |
| 5 1B | NO STOCK | HEAT SINK | |
| 11 1A | A01-0421-02 | METALLIC CABINET | *P |
| 12 3A | A20-3105-12 | FRONT PANEL ASSY | UM |
| 12 3A | A20-3105-12 | FRONT PANEL ASSY | UE |
| 12 3A | A20-3105-12 | FRONT PANEL ASSY | HX |
| 12 3A | A20-3105-12 | FRONT PANEL ASSY | E |
| 12 3A | A20-3106-12 | FRONT PANEL ASSY | *T |
| 12 3A | A20-3129-12 | FRONT PANEL ASSY | *K |
| - | B46-0055-30 | WARRANTY CARD | P |
| - | B46-0060-00 | WARRANTY CARD | T |
| - | B46-0061-30 | WARRANTY CARD | K |
| - | B46-0062-30 | WARRANTY CARD | UH |
| - | B46-0062-30 | WARRANTY CARD | UE |
| - | B46-0063-13 | WARRANTY CARD MILITARY | UH |
| - | B46-0063-13 | WARRANTY CARD MILITARY | UE |
| - | B46-0064-20 | WARRANTY CARD | X |
| - | B46-0078-03 | WARRANTY CARD | E |
| - | B50-3463-00 | INSTRUCTION MANUAL | *K |
| - | B50-3464-00 | INSTRUCTION MANUAL(E) | *P |
| - | B50-3464-00 | INSTRUCTION MANUAL(E) | MH |
| - | B50-3464-00 | INSTRUCTION MANUAL(E) | UE |
| - | B50-3464-00 | INSTRUCTION MANUAL(E) | UX |
| - | B50-3465-00 | INSTRUCTION MANUAL(F) | *P |
| - | B50-3466-00 | INSTRUCTION MANUAL(F) | MX |
| - | B50-3466-00 | INSTRUCTION MANUAL(SP) | *M |
| - | B50-3467-00 | INSTRUCTION MANUAL | *T |
| - | B50-3468-00 | INST. MANUAL(E,F,D,SP) | *E |
| 13 3A | B08-6015-04 | INDICATOR | * |
| 14 3A | B10-0318-04 | FRONT GLASS | * |
| - | C24-1710-57 | ELECTRO 1UF 50WV | UM |
| - | C91-0023-05 | CERAMIC 0.01UF AC250V | UE |
| - | C91-0023-05 | CERAMIC 0.01UF AC250V | HX |
| - | C91-0023-05 | CERAMIC 0.01UF AC250V | KP |
| - | C91-0079-05 | CERAMIC 0.01UF AC125V | TE |
| 15 1B | E03-0035-05 | AC OUTLET | KU |
| 15 1B | E03-0035-05 | AC OUTLET | MH |
| 15 1B | E03-0035-05 | AC OUTLET | UE |
| 15 1B | E03-0035-05 | AC OUTLET | X |
| 15 1B | E03-0045-05 | AC OUTLET | P |
| 16 1B | E30-0181-05 | POWER CORD | KP |
| 16 1B | E30-0580-05 | POWER CORD | E |
| 16 1B | E30-0587-15 | POWER CORD | T |
| 16 1B | E30-0649-05 | POWER CORD | X |
| 16 1B | E30-0683-05 | POWER CORD | UM |
| 16 1B | E30-0683-05 | POWER CORD | UE |
| 16 1B | E30-0683-05 | POWER CORD | H |
| 17 3A | G01-0453-04 | COIL SPRING | |
| - | H01-3356-04 | CARTON BOX | *K |
| - | H01-3357-04 | CARTON BOX | *P |
| - | H01-3357-04 | CARTON BOX | UM |
| - | H01-3357-04 | CARTON BOX | UE |
| - | H01-3357-04 | CARTON BOX | HX |

E : Scandinavia & Europe H : Audio Club K : USA P : Canada

S : South Africa T : England U : PX (Far East, Hawaii)

UE : AAFES (Europe) X : Australis M : Other Areas

| Ref. No. 参照番号 | Parts No. 部品番号 | Description 部品名 / 規格 | Re- marks 備考 |
|------------------|-------------------|-------------------------|--------------------|
| - | H01-3357-04 | CARTON BOX | E |
| - | H01-3358-04 | CARTON BOX | *T |
| - | H10-1599-02 | POLYSTYRENE FIXTURE | |
| - | H20-0452-04 | COVER | |
| - | H25-0078-04 | BAG (235x315) | |
| - | H25-0170-04 | BAG | |
| 18 3B | J02-0118-04 | FOOT | KP |
| 19 1B | J42-0083-05 | BUSHING | UM |
| 19 1B | J42-0083-05 | BUSHING | UE |
| 19 1B | J42-0083-05 | BUSHING | HT |
| 19 1B | J42-0083-05 | BUSHING | E |
| 19 1B | J42-0085-05 | BUSHING | X |
| 20 3A | J42-0095-05 | BUSHING | |
| 22 3A | K27-0683-04 | KNOB POWER | |
| 23 3A | K27-0684-04 | KNOB SPKR.A | |
| 24 3A | K27-0685-04 | KNOB SPKR.B | |
| 25 3A | K27-0686-03 | KNOB TAPE | |
| 26 3A | K27-0687-03 | KNOB (A/B) | |
| 27 3A | K27-0688-13 | KNOB MM/MC | |
| 28 3A | K27-0689-13 | KNOB PHONO | |
| 29 3A | K27-0690-13 | KNOB TUNER | |
| 30 3A | K27-0691-13 | KNOB AUX. | |
| 31 3A | K27-0692-04 | KNOB TONE,LOUD | |
| 32 3A | K29-0458-04 | KNOB VOL. | |
| 33 3A | K29-0459-04 | KNOB REC,BAL,TONE | |
| 34 1A | L01-2481-05 | POWER TRANS | *K |
| 34 1A | L01-2481-05 | POWER TRANS | P |
| 34 1A | L01-2482-15 | POWER TRANS | *T |
| 34 1A | L01-2485-05 | POWER TRANS | *U |
| 34 1A | L01-2485-05 | POWER TRANS | MH |
| 34 1A | L01-2485-05 | POWER TRANS | UE |
| 34 1A | L01-2485-05 | POWER TRANS | X |
| 34 1A | L01-2485-05 | POWER TRANS | *E |
| 34 1A | L01-2486-15 | POWER TRANS | |
| 35 1B | N08-0128-35 | GND TERMINAL | |
| - | S31-2050-05 | SLIDE SWITCH(POWER) | UM |
| - | S31-2050-05 | SLIDE SWITCH(POWER) | UE |
| - | S31-2050-05 | SLIDE SWITCH(POWER) | HX |
| - | S31-2050-05 | SLIDE SWITCH(POWER) | E |
| 37 2B | S40-1014-05 | PUSH SWITCH (POWER) | UM |
| 37 2B | S40-1014-05 | PUSH SWITCH (POWER) | UE |
| 37 2B | S40-1015-05 | PUSH SWITCH (POWER) | HX |
| 37 2B | S40-1015-05 | PUSH SWITCH (POWER) | KP |
| 37 2B | S40-1047-05 | PUSH SWITCH (POWER) | TE |
| 39 2B | S90-0056-05 | SWITCH SHAFT | |
| 40 2A | V01-1095-60 | 2SA1095(O) Q3,4 | |
| 41 2A | V02-0688-20 | 2SB688(R) Q7,8 | |
| 42 2A | V03-2565-70 | 2SC2565(O) Q1,2 | |
| 43 2A | V04-0718-20 | 2SD718(R) Q5,6 | |
| 44 2A | X07-1950-01 | POWER AMP PCB ASSY | *U |
| 44 2A | X07-1950-01 | POWER AMP PCB ASSY | MH |
| 44 2A | X07-1950-01 | POWER AMP PCB ASSY | UE |
| 44 2A | X07-1950-01 | POWER AMP PCB ASSY | XT |
| 44 2A | X07-1950-10 | POWER AMP PCB ASSY | *K |
| 44 2A | X07-1950-10 | POWER AMP PCB ASSY | P |
| 44 2A | X07-1952-71 | POWER AMP PCB ASSY | *E |
| 45 2B | X08-1980-10 | PRE AMP PCB ASSY | *K |
| 45 2B | X08-1980-10 | PRE AMP PCB ASSY | P |
| 45 2B | X08-1980-81 | PRE AMP PCB ASSY | *U |

E : Scandinavia & Europe H : Audio Club K : USA P : Canada

S : South Africa T : England U : PX (Far East, Hawaii)

UE : AAFES (Europe) X : Australis M : Other Areas

PARTS LIST

★ New Parts

Parts without **Parts No.** are not supplied.Les articles non mentionnés dans le **Parts No.** ne sont pas fournis.Teile ohne **Parts No.** werden nicht geliefert.

| Ref. No. 参照番号 | Parts No. 部品番号 | Description 部品名 / 規格 | Re- marks 備考 |
|-------------------------|-------------------|-------------------------|--------------------|
| 45 2B | X08-1980-81 | PRE AMP PCB ASSY | MH |
| 45 2B | X08-1980-81 | PRE AMP PCB ASSY | UE |
| 45 2B | X08-1980-81 | PRE AMP PCB ASSY | XT |
| 45 2B | X08-1982-71 | PRE AMP PCB ASSY | *E |
| 46 1A | X13-3590-10 | SUB PCB ASSY | *K |
| 46 1A | X13-3590-10 | SUB PCB ASSY | P |
| 46 1A | X13-3590-51 | SUB PCB ASSY | *T |
| 46 1A | X13-3590-81 | SUB PCB ASSY | *U |
| 46 1A | X13-3590-81 | SUB PCB ASSY | MH |
| 46 1A | X13-3590-81 | SUB PCB ASSY | UE |
| 46 1A | X13-3590-81 | SUB PCB ASSY | X |
| 46 1A | X13-3592-71 | SUB PCB ASSY | *E |
| 47 2A | X13-3680-10 | SUB PCB ASSY | * |
| POWER AMP (X07-1950-10) | | | |
| C3 ,4 | C71-1710-15 | CERAMIC 100PF J | |
| C5 ,6 | C24-2022-47 | ELECTRO 0.22UF 100WV | |
| C7 ,8 | C52-1710-26 | CERAMIC 0.001UF K | |
| C9 ,10 | C24-1047-67 | ELECTRO 47UF 10WV | |
| C13 ,14 | C71-1701-01 | CERAMIC 1PF C | KP |
| C13 ,14 | C71-1703-01 | CERAMIC 3PF C | E |
| C15 ,16 | C71-1702-01 | CERAMIC 2PF C | |
| C17 ,18 | C71-1702-01 | CERAMIC 2PF C | |
| C19 ,20 | C71-1710-02 | CERAMIC 10PF D | |
| C21 ,22 | C71-1733-05 | CERAMIC 33PF J | |
| C23 ,24 | C71-1727-05 | CERAMIC 27PF J | |
| C25 ,26 | C24-2010-57 | ELECTRO 1UF 100WV | |
| C27 ,28 | C52-1715-26 | CERAMIC 0.0015UF K | |
| C29 ,30 | C52-1715-26 | CERAMIC 0.0015UF K | |
| C31 ,32 | C46-1710-36 | MYLAR 0.01UF K | |
| C33 ,34 | C46-1747-46 | MYLAR 0.47UF K | |
| C39 ,40 | C71-1747-05 | CERAMIC 47PF J | E |
| C41 | C26-1022-67 | ELECTRO 22UF 10WV | |
| C42 | C24-1022-67 | ELECTRO 22UF 10WV | |
| C43 | C25-1247-67 | LL-ELEC 47UF 16WV | |
| C44 | C25-6547-57 | ELECTRO 4.7UF 35WV | |
| C46 | C24-1447-67 | ELECTRO 47UF 25WV | |
| C49 ,50 | C52-1768-16 | CERAMIC 680PF K | |
| C51 ,52 | C46-1727-36 | MYLAR 0.027UF K | |
| C53 ,54 | C46-1727-36 | MYLAR 0.027UF K | |
| C55 ,58 | C46-1712-46 | MYLAR 0.12UF K | |
| C59 ,60 | C46-1782-26 | MYLAR 0.0082UF K | |
| C61 ,62 | C46-1782-26 | MYLAR 0.0082UF K | |
| C63 ,66 | C46-1739-36 | MYLAR 0.039UF K | |
| C67 ,68 | C47-1718-15 | POLYSTY 180PF J | |
| C69 ,70 | C46-1727-26 | MYLAR 0.0027UF K | |
| C71 ,74 | C24-1226-67 | ELECTRO 22UF 16WV | |
| C75 ,78 | C24-2010-67 | ELECTRO 10UF 100WV | |
| C79 ,82 | C24-1710-67 | ELECTRO 10UF 50WV | |
| C83 ,84 | C26-1710-57 | NP-ELEC 1UF 50WV | |
| C91 ,94 | C71-1710-15 | CERAMIC 100PF J | |
| R27 ,28 | R47-5412-35 | FL-PROOF RS12K J 3A | |
| R27 ,28 | R47-5412-35 | FL-PROOF RS12K J 3A | |
| R29 ,32 | R42-1210-25 | FL-PROOF 1K J 2E | |
| R43 ,44 | R49-6243-33 | RN 43K F 2E | |
| R49 ,50 | R43-1213-15 | FL-PROOF RD130 J 2E | |
| R51 ,52 | R47-5410-35 | FL-PROOF RS 10K J 3A | |
| R53 ,54 | R43-1222-15 | FL-PROOF RD220 J 2E | |
| R59 ,60 | R43-1222-15 | FL-PROOF RD220 J 2E | |
| R61 ,64 | R43-1233-15 | FL-PROOF RD330 J 2E | |
| R65 ,68 | R43-1256-15 | FL-PROOF RD560 J 2E | |
| R69 ,72 | R43-1210-15 | FL-PROOF RD100 J 2E | |

For POWER AMP

K : X07-1950-10

P : X07-1951-01

E : X07-1952-71

| Ref. No. 参照番号 | Parts No. 部品番号 | Description 部品名 / 規格 | Re- marks 備考 |
|-----------------------|-------------------|-------------------------|--------------------|
| R89 ,90 | R43-1247-95 | FL-PROOF RD4.7 J 2E | |
| R93 ,94 | R43-1268-95 | FL-PROOF RD6.8 J 2E | |
| R97 ,98 | R43-1247-95 | FL-PROOF RD4.7 J 2E | |
| R99 ,100 | R43-1268-95 | FL-PROOF RD6.8 J 2E | |
| R113 ,114 | R90-0187-05 | MULTIPLE COMPONENTS | |
| R123 ,124 | R47-5510-05 | FL-PROOF RS10 J 3D | |
| R125 ,126 | R43-1247-95 | FL-PROOF RD4.7 J 2E | |
| R127 ,128 | R43-1233-05 | FL-PROOF RD33 J 2E | |
| R141 | R47-5427-25 | FL-PROOF RS2.7K J 3A | |
| R143 | R47-5447-15 | FL-PROOF RS470 J 3A | PE |
| R143 | R47-5468-15 | FL-PROOF RS680 J 3A | K |
| R161 ,162 | R40-8339-57 | RC 3.9M M 2H | |
| R165 ,168 | R43-1218-15 | FL-PROOF RD180 J 2E | |
| VR1 ,2 | R12-0502-05 | TRIMMING POT. | |
| VR3 ,4 | R12-0302-05 | TRIMMING POT. | |
| VR5 ,6 | R06-4053-05 | POTENTIOMETER | |
| RL1 | S51-2045-05 | RELAY | |
| S1 | S42-3049-05 | PUSH SWITCH | |
| D1 ,2 | V11-0271-05 | 1S2076 | |
| D3 ,4 | V11-4103-60 | XZ-051 | |
| D5 ,6 | V11-0271-05 | 1S2076 | |
| D7 ,10 | V11-0273-05 | 1S2076A | |
| D11 ,14 | V11-0271-05 | 1S2076 | |
| D15 ,22 | V11-0273-05 | 1S2076A | |
| D23 ,26 | V11-5102-30 | UF-21 | |
| D27 ,28 | V11-0273-05 | 1S2076A | |
| D29 ,30 | V11-5101-70 | STV-2H(O) | |
| D31 | V11-4109-40 | EZ-242 | |
| D33 ,34 | V11-0273-05 | 1S2076A | |
| D35 ,38 | V11-0271-05 | 1S2076 | |
| IC1 | V30-0678-10 | UPC1237H | |
| Q5 ,6 | V03-2003-00 | 2SC2003 | |
| Q7 ,10 | V03-1845-10 | 2SC1845(F,E) | |
| Q11 ,12 | V30-0547-10 | UPA74V(F,E) | |
| Q15 ,18 | V01-1124-20 | 2SA1124(Q,R,S) | |
| Q19 ,20 | V03-2632-20 | 2SC2632(Q,R,S) | |
| Q21 ,22 | V03-2631-10 | 2SC2631(Q,R,S) | |
| Q23 ,24 | V01-1123-10 | 2SA1123(Q,R,S) | |
| Q25 ,26 | V03-2591-20 | 2SC2591(Q,R,S) | |
| Q27 ,28 | V01-1111-20 | 2SA1111(Q,R,S) | |
| Q29 ,30 | V01-0954-00 | 2SA954 | |
| Q31 ,32 | V03-2003-00 | 2SC2003 | |
| Q33 ,34 | V01-0999-10 | 2SA999(E,F) | |
| Q35 ,36 | V03-2320-00 | 2SC2320 | |
| Q37 ,38 | V03-1841-00 | 2SC1841 | |
| Q39 ,42 | V01-0988-00 | 2SA988 | |
| Q43 ,44 | V03-1841-00 | 2SC1841 | |
| Q53 ,54 | V03-1841-00 | 2SC1841 | |
| Q55 ,56 | V03-2631-10 | 2SC2631(Q,R,S) | |
| Q57 ,58 | V01-0999-10 | 2SA999(E,F) | |
| Q59 ,60 | V30-0716-10 | UPA68H(K,L) | |
| Q61 ,62 | V03-1841-00 | 2SC1841 | |
| Q63 | V01-0988-00 | 2SA988 | |
| PRE AMP (X08-1980-10) | | | |
| C1 ,2 | C71-1718-15 | CERAMIC 180PF J | KU |
| C3 ,4 | C24-0833-87 | ELECTRO 330UF 6.3WV | |
| C5 ,6 | C49-2051-34 | POLYPRO 0.051UF G | |
| C7 ,8 | C49-2015-34 | MYLAR 0.015UF J | |
| C11 ,12 | C26-1733-57 | NP-ELEC 3.3UF 50WV | |
| C13 ,14 | C47-1710-25 | POLYSTY 1000PF J | |
| C15 ,16 | C52-1715-26 | CERAMIC 0.0015UF K | |

For PRE AMP

K : X08-1980-10

U : X08-1980-81

E : X08-1982-71

KA-9X/G

KA-9X/G

KA-9X/G

PARTS LIST

★ New Parts

Parts without **Parts No.** are not supplied.Les articles non mentionnés dans le **Parts No.** ne sont pas fournis.Teile ohne **Parts No.** werden nicht geliefert.

| Ref. No. 参照番号 | Parts No. 部品番号 | Description 部品名 / 規格 | Re- marks 備考 |
|-------------------|-------------------|-------------------------|--------------------|
| C17 ,18 | C71-1715-15 | CERAMIC 150PF J | |
| C19 ,20 | C71-1733-05 | CERAMIC 33PF J | |
| C21 ,22 | C71-1705-01 | CERAMIC 5PF C | |
| C23 ,24 | C71-1727-15 | CERAMIC 270PF J | |
| C25 ,26 | C71-1768-05 | CERAMIC 68PF J | E |
| C27 ,28 | C71-1718-15 | CERAMIC 180PF J | E |
| C29 ,30 | C52-1722-26 | CERAMIC 0.0022UF K | E |
| C31 ,32 | C46-1710-36 | MYLAR 0.01UF K | |
| C33 ,34 | C24-6510-77 | ELECTRO 100UF 35WV | |
| C41 ,42 | C26-1722-47 | NP-ELEC 22UF 50WV | |
| C43 ,44 | C71-1722-15 | CERAMIC 220PF J | |
| C45 ,46 | C46-1727-36 | MYLAR 0.027UF K | |
| C47 | C24-1710-47 | ELECTRO 0.1UF 50WV | |
| - | E06-0510-05 | CONNECTOR | |
| - | E13-0432-05 | PHONO JACK | |
| - | E13-0618-05 | PHONO JACK | |
| - | E40-0556-05 | PIN CONNECTOR | |
| - | E40-0756-05 | PIN CONNECTOR | |
| L1 ,2 | L40-1511-43 | INDUCTOR | E |
| R11 ,12 | R48-2107-03 | RN 107 F 2E | |
| R13 ,14 | R48-6282-95 | RN 8,2 J 2E | |
| R15 ,16 | R48-2619-23 | RN 61,9K F 2E | |
| R17 ,18 | R48-2511-13 | RN 5,11K F 2E | |
| R19 ,20 | R48-2233-05 | RN 33 J 2E | |
| R31 ,32 | R43-1247-95 | FL-PROOF RD4,7 J 2E | |
| VR1 | R06-5062-05 | POTENTIOMETER | |
| VR2 | R06-5087-05 | POTENTIOMETER | |
| S1 | S90-0038-05 | SLIDE SWITCH | |
| S2 | S42-4018-05 | PUSH SWITCH | |
| S3 | S42-2055-05 | PUSH SWITCH | |
| S4 -6 | S40-2122-05 | PUSH SWITCH | |
| D1 ,2 | V11-0358-05 | WZ-260 | |
| IC1 ,2 | V30-0520-10 | TA2010A | |
| Q1 -8 | V09-0158-20 | 2SK170(BL) | |
| Q9 | V03-2167-00 | 2SC2167 | |
| Q10 | V01-0957-00 | 2SA957 | |
| Q11 ,12 | V09-0127-40 | 2SK105(H,J) | |
| SUB (X13-3590-10) | | | |
| 46 2A | B30-0320-05 | LAMP | |
| D9 -12 | B30-0322-05 | LAMP | |
| D13 -16 | B30-0321-05 | LAMP | |
| C1 -4 | C54-2710-39 | CERAMIC 0.01UF P | |
| C5 | C24-1710-77 | ELECTRO 100UF 50WV | |
| C6 ,7 | C90-0576-05 | ELECTRO 6800UF 42WV | |
| C8 ,9 | C90-0572-05 | ELECTRO 8200UF 80WV | |
| C10 -13 | C46-1710-46 | MYLAR 0.1UF K | |
| C14 | C91-0079-05 | CERAMIC 0.01UF AC125V | |
| C15 ,16 | C24-1733-77 | ELECTRO 330UF 50WV | |
| - | E11-0093-05 | PHONE JACK | |
| - | E20-0814-05 | TERMINAL BOARD SPEAKER | |
| F1 | F05-3122-05 | FUSE 250V,F3.15A | TE |
| F1 | F05-6021-05 | FUSE 250V, 6A | U |
| F1 | F05-7026-05 | FUSE 250V, 7A | K |
| F2 | F05-3022-05 | FUSE 250V, 3A | U |
| F2 | F05-6322-05 | FUSE 250V,F6.3A | E |
| - | J13-0041-05 | FUSE HOLDER | KU |
| - | J13-0054-05 | FUSE HOLDER | TE |
| L1 ,2 | L39-0085-05 | COIL | |

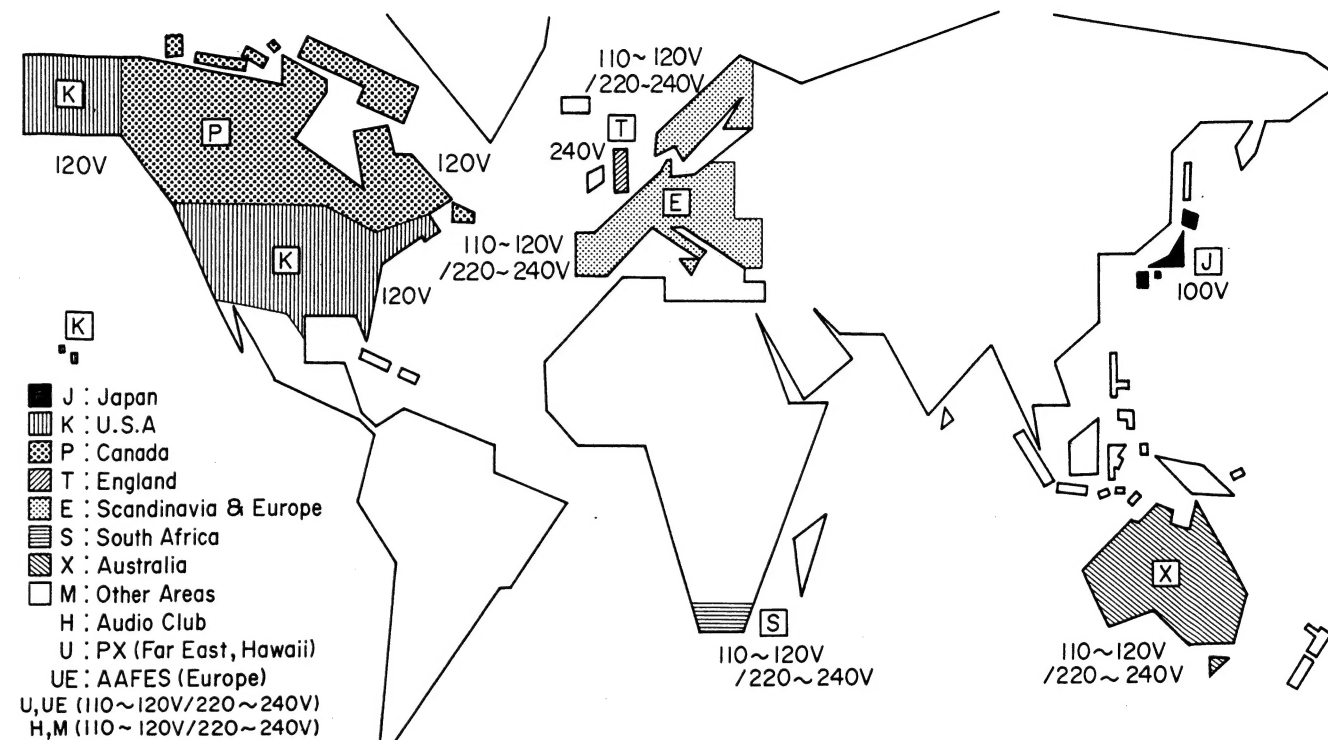
For SUB

K : X13-3590-10 T : X13-3590-51

U : X13-3590-81 E : X13-3592-71

| Ref. No. 参照番号 | Parts No. 部品番号 | Description 部品名 / 規格 | Re- marks 備考 |
|------------------|-------------------|-------------------------|--------------------|
| R1 ,2 | R47-5427-25 | FL-PROOF RS2.7K J 3A | |
| R3 | R47-5568-05 | FL-PROOF RS68 J 3D | |
| R3 | R47-5582-05 | FL-PROOF RS82 J 3D | |
| R4 | R47-5568-05 | FL-PROOF RS68 J 3D | |
| R4 | R47-5582-05 | FL-PROOF RS82 J 3D | |
| R5 -8 | R47-5510-05 | FL-PROOF RS10 J 3D | |
| R9 ,10 | R47-5547-15 | FL-PROOF RS470 J 3D | |
| R11 ,12 | R47-5401-05 | FL-PROOF RS1 J 3A | |
| R13 ,14 | R47-5556-15 | FL-PROOF RS560 J 3D | |
| R15 ,16 | R47-5410-05 | FL-PROOF RS10 J 3A | |
| S1 | S42-2056-05 | PUSH SWITCH | |
| D1 | V11-2101-40 | M4C-51-12*1 | |
| D2 | V11-0295-05 | W06B | |
| D3 -6 | V11-1300-10 | S3V20 | |
| D7 ,8 | V11-4112-00 | WZ-046 | |
| D17 ,18 | V11-4103-80 | WZ-157 | |
| SUB(X13-3680-10) | | | |
| C1 | C24-2047-57 | ELECTRO 4.7UF 100WV | |
| - | E23-0047-04 | TERMINAL | |
| D1 | V11-0200-05 | V06C | |
| Q1 ,2 | V09-0144-20 | 2SK163(M,N) | |

WORLD MAP & AREA CODE



Note:

Component and circuitry are subject to modification to insure best operation under differing local conditions. This manual is based on, the U.S. (K) standard, and provides information on regional circuit modification through use of alternate schematic diagrams, and information on regional component variations through use of parts list.

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